INDUSTRIAL STANDARDIZATION

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Published by the
AMERICAN STANDARDS ASSOCIATION

VOLUME 4 JUNE • 1933 NUMBER 6

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The American Standards Association is organized to provide systematic means of cooperation in establishing American Standards to the end that duplication of work and the promulgation of conflicting standards may be avoided; to serve as a clearing house for information on standardization work in the United States and foreign countries; to act as the authoritative American channel in international cooperation in standardization work

Subscription price $4.00 per year (foreign $5.00); single copies 35 cents

Specification and Enquiry Methods in Industrial Purchasing

by

R. H. White, *Purchasing Controller*
Marconi Group of Companies[1]

Purchase methods used by the Marconi Group of Companies including a combination of specification and enquiry

The following is an abstract of a paper presented before the British Industrial Purchasing Officers' Association in London, England, and published in "Industrial Welfare and Personnel Management," London. The paper is reprinted here by special permission of the editor of "Industrial Welfare and Personnel Management."

Before entering upon the subject matter of this paper, I think it well to refer in general to the expression "central purchasing" and the systems of working which are called by that name.

Unfortunately, at present there is little uniformity in this matter. One person means by "central purchasing" that the function of purchasing for all the departments in one building is centralized and performed from one purchasing office.

Another means that not only are all departments in one building required to requisition on one central purchasing office, but that all departments in various buildings and companies have to requisition through one central purchasing department.

There is a third system, and to my mind the best, where there is a central purchasing and controlling office. Large works or companies of the same organization have their own local central branch purchasing officers, the branches all under one central control. Under this system each branch can place its own orders up to a stipulated value, sending copies of such orders to the central office, where all prices paid are compared. The central office can, at any time, take control of any article found to be in general use by several companies or works, and having taken control, can effect either a bulk purchase of that commodity for delivery to all the works, or can make a joint contract or agreement for the supply of that commodity on behalf of all the companies and then, as soon as the contract or agreement is made, advise the various works of the fact and send them a copy of the contract, so that they may revert to the practice of placing their own orders, but they will then place them as "drawing orders" against the contract.

In this paper, where the expression "central purchasing" or "central control" is employed, it is this third alternative form of central purchasing which I have in mind.

The work of the purchasing officer begins when he receives a requisition for an article together with an adequate description of the article required.

Now the description may be in the form of a sample, a drawing, or a specification, or a combination of these three. They all have their uses, and the purchasing officer should so arrange matters that he receives the description of the goods required in a form which will enable him to get the best value for his company's money.

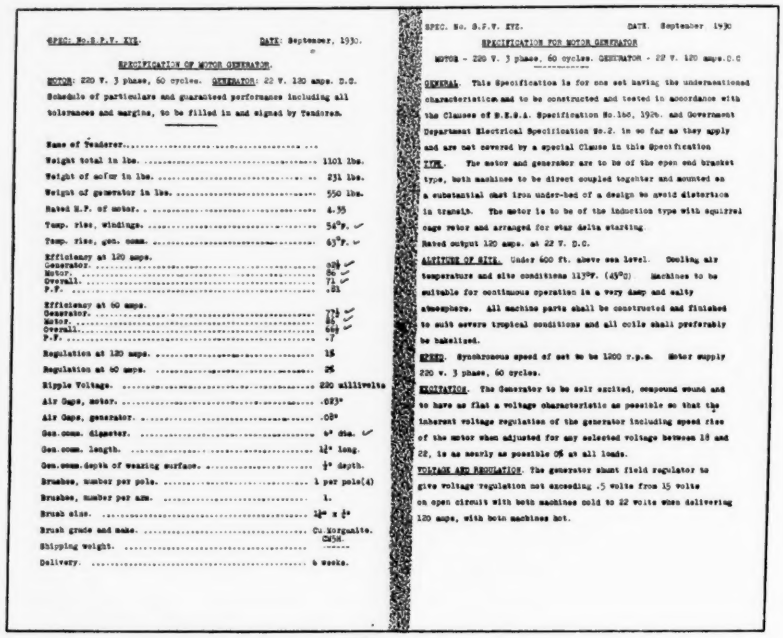
There are cases in which a sample is better than a detailed specification, but I think that there are more cases in engineering central purchasing where a sample should not be used than those in which it should.

As an example of a case where a sample is admissible, I would cite a copper rivet of a type occasionally used by a firm. I think that all articles in general use should be covered by a specification, but if the rivet is only occasionally required, then it is an adequate description to state that "10 gross of Snap Head Copper Rivets ⅛ in. diameter, 1 in. long under head, as sample," are required. Such a form of requisition for an occasional use as opposed to a regular use is admissible, for we must remember that specifications are costly to prepare and we should not demand detailed specifications for an article for which there is infrequent demand. The sample costs little and enables the manufacturer to obtain the exact dimensions, the hardness, and purity of the copper, and to quote us promptly for a suitable article. In this case, we should undoubtedly call upon the manufacturer to send in a counter sample with his quotation for comparison

[1] London, England.

with our sample, a duplicate of which will have been filed under the enquiry number, in the sample room.

On the other hand, to give a case in which I submit that the use of samples is to be deprecated, I



SPEC. No.S.P.V. XYZ. DATE: September, 1930.

SPECIFICATION OF MOTOR GENERATOR.

MOTOR: 220 V. 3 phase, 60 cycles. GENERATOR: 22 V. 120 amps. D.C.

Schedule of particulars and guaranteed performance including all tolerances and margins, to be filled in and signed by Tenderer.

Name of Tenderer	
Weight total in lbs.	1101 lbs.
Weight of motor in lbs.	231 lbs.
Weight of generator in lbs.	550 lbs.
Rated H.P. of motor.	4.35
Temp. rise, windings.	54°F.
Temp. rise, gen. comm.	63°F.
Efficiency at 120 amps.	
Generator.	82½
Motor.	84
Overall.	71
P.F.	.81
Efficiency at 60 amps.	
Generator.	77½
Motor.	86
Overall.	669
P.F.	.7
Regulation at 120 amps.	1%
Regulation at 60 amps.	0%
Ripple Voltage.	220 millivolts
Air Gaps, motor.	.023"
Air Gaps, generator.	.028"
Gen.comm. diameter.	4" dia.
Gen.comm. length.	1½" long.
Gen.comm.depth of wearing surface.	¼" depth.
Brushes, number per pole.	1 per pole(4)
Brushes, number per arm.	1.
Brush size.	½" x ¼"
Brush grade and make.	Cu.Morganite. CM5H.
Shipping weight.	
Delivery.	4 weeks.

SPEC. No. S.P.V. XYZ. DATE. September 1930

SPECIFICATION FOR MOTOR GENERATOR

MOTOR - 220 V. 3 phase, 60 cycles. GENERATOR - 22 V. 120 amps.D.C

GENERAL. This Specification is for one set having the undermentioned characteristics and to be constructed and tested in accordance with the Clauses of B.E.S.A. Specification No.150, 1926. and Government Department Electrical Specification No.2. in so far as they apply and are not covered by a special Clause in this Specification

TYPE. The motor and generator are to be of the open end bracket type, both machines to be direct coupled together and mounted on a substantial cast iron under-bed of a design to avoid distortion in transit. The motor is to be of the induction type with squirrel cage rotor and arranged for star delta starting.

Rated output 120 amps. at 22 V. D.C.

ALTITUDE OF SITE. Under 600 ft. above sea Level. Cooling air temperature and site conditions 113°F. (45°C) Machines to be suitable for continuous operation in a very damp and salty atmosphere. All machine parts shall be constructed and finished to suit severe tropical conditions and all coils shall preferably be baketized.

SPEED. Synchronous speed of set to be 1200 r.p.m. Motor supply 220 v. 3 phase, 60 cycles.

EXCITATION. The Generator to be self excited, compound wound and to have as flat a voltage characteristic as possible so that the inherent voltage regulation of the generator including speed rise of the motor when adjusted for any selected voltage between 18 and 22, is as nearly as possible 0% at all loads.

VOLTAGE AND REGULATION. The generator shunt field regulator to give voltage regulation not exceeding .5 volts from 15 volts on open circuit with both machines cold to 22 volts when delivering 120 amps, with both machines hot.

FIG. 1

Example of questionnaire type of specification used by the Marconi Companies

would cite the issuing of an ammeter of known make with a request for quotations for ammeters "exactly as per sample." The sample ammeter is the product of a particular manufacturer—its worth is largely dependent upon its technical design, its accuracy, its efficiency, as well as the materials and workmanship which go into its construction. It may not be patented, its design may not even be registered, but I do feel that we should be doing an unfair thing to the designer—and we are mostly designers and sellers, as well as buyers—by encouraging a competitor, possibly a continental one, to make "a Chinese copy" of any article in the making of which design and arrangement play a prominent part.

This is a case where a specification should be used. We can specify that the goods shall be of a certain size, depth, and diameter. We can specify the material of the front and of the base; the material of which the case is to be made; the size, diameter, and length of the connecting studs; their position in the instrument; the shape and material of the scale; and the general type of instrument, *i.e.,* moving iron or moving coil; the current which is required to give full scale deflection; and the working current upon which it will be employed. We can further specify that in general the instruments shall be to the British Standards Institution grade I or II standard, or any other degree of accuracy which we may require, leaving the tenderer to offer his nearest standard instrument or to submit a design of his own to meet our requirements. I shall refer to this again.

Drawings as a rule are supplementary to a specification. In some cases of simple requirements, the drawing may have printed upon it a short specification setting out the materials to be employed, the tolerances which have to be adhered to, the color and finish required of the parts shown. This may be an adequate description when issued with an enquiry. In connection with drawings, the purchasing officer can sometimes save his company considerable sums of money by looking at the drawings before they are issued from his department; for he looks at the drawings differently from the draughtsman who had prepared them, and he may notice that the drawing calls for a certain material or process, while in the knowledge of the purchasing officer there is another material or proc-

ess in use for a similar part required by another of the companies or branches for which he is purchasing.

As an example, it may be that a part is shown as a machined casting, while the purchasing officer happens to know of a standard pressing which would do the job. A conversation with the engineer responsible would save money in a case such as this.

In many cases I do not consider it advisable to issue full working drawings with an enquiry but think it better to issue sketch drawings in conjunction with specifications giving the essential dimensions and loads which the structure will be called upon to withstand. We thus encourage the tenderer to offer us the best that he can give for the job.

There are many different forms in which a specification can be drawn up, but I think they fall into two general types—the exact, firm, detailed specification, which is still very necessary in certain cases; and the questionnaire type.

The firm, detailed specification is so well known that it requires little comment. As a simple example of this type of specification, I would quote a material specification for a commodity which is in general use, such as industrial methylated spirits. A sufficient specification of this would be:

> "The spirit shall be 64 per cent over proof. Its specific gravity shall be .8215 to 60 F. The paraffin content shall be nil. The turpens content shall be nil. There shall be no pyridene or pyridene bases in the spirit. The spirit shall not contain more than 5 per cent methyl alcohol. The total impurities shall not exceed .2 per cent while the non volatile impurities shall not exceed .1 per cent by weight.
>
> "NOTE—The total impurities may be defined as residues per 100 cubic centimeter at 100 C and would normally consist of wood, tar, etc."

This is a simple commercial specification, but you will notice it is a definite one and leaves the supplier no latitude except that he may give you a spirit containing less impurities than .2 per cent.

Now, as an example of the questionnaire type of specification which has been largely developed by Mr. Atkinson, an engineer in the Marconi Company, I give an abridged form of this in Figure 1. You will notice that it falls into two parts. The right hand side is a portion of the specification of requirements, while on the left hand side is a portion of the schedule of particulars and guaranteed performance, or the questionnaire portion.

In drawing up specifications of this type, the engineer will naturally be guided by the particular use to which the machine covered by the specification will be put. For instance, in one case it may be essential that the machine shall run at a definite predetermined speed; then in that case the speed will be stated as fixed and will appear on the requirements side, while the size and efficiency offered to give this speed will appear on the schedule side.

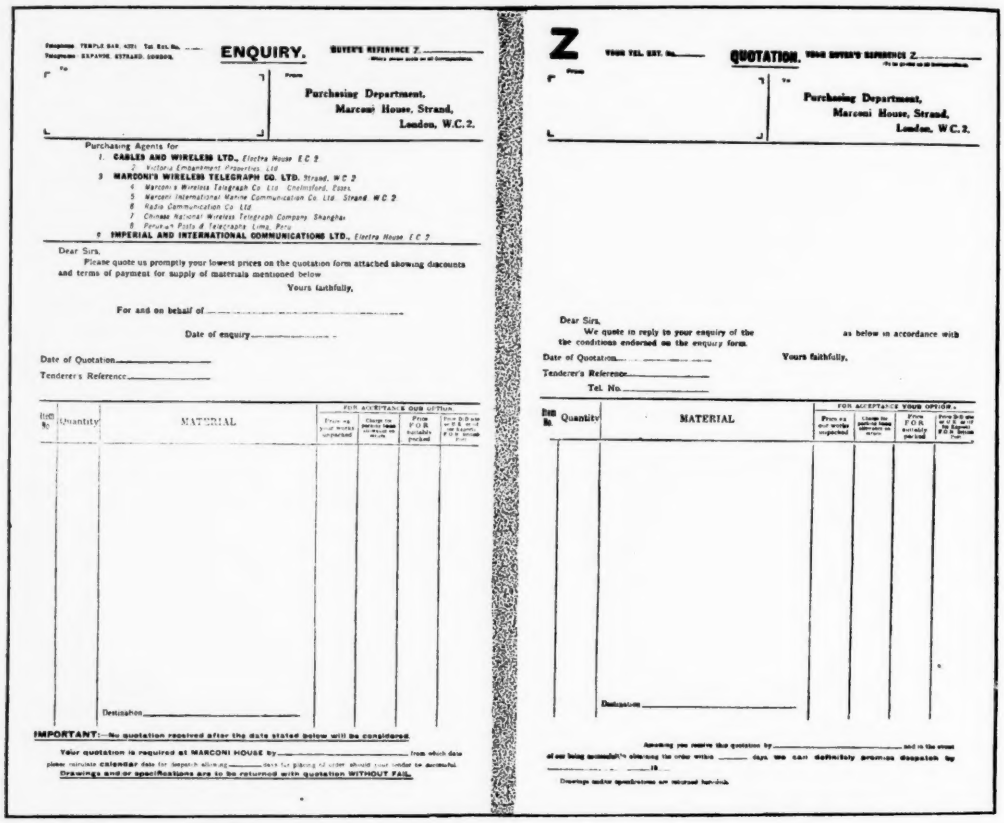
In another case, say that of a dynamo for use in an airplane, the maximum size and weight may appear on the requirements side, while the manufacturer will be invited, on the schedule side, to state the biggest output which he can guarantee from a machine complying with these requirements as to size and weight.

The use of this type of specification materially reduces the time required to be given to purchasing a given article; for with such a specification it becomes unnecessary to have repeated meetings with manufacturers in order to ascertain what they can produce to meet our requirements and then to write up a firm, detailed specification calling for the best which you know they can do. It also enables us to treat all quoting firms absolutely fairly, which is sometimes impossible with the older method of fixed specifications, particularly when the specification is written around the product of a certain firm. In the latter case, if a detailed specification is written up and issued, the firm whose machine is described is obviously in a position of great advantage, as it has the patterns, tools, and frames for producing that particular machine, while in all probability its competitors have not.

Lastly, the making of comparisons becomes an easy and in part almost an automatic operation, for the tenders when received are laid out one on top of the other so that even the names of the competing firms may be hidden, while the guaranteed performance figures are exposed on the right hand side of the sheets. It is thus an easy matter to run through all quotations and tick off the favorable points in each tender. Of course all points are not of equal value and, therefore, a total of ticks in favor of one firm would not be a fair way of assessing the value of any tender, but it does enable us to separate the valuable from the non-useful tenders, and to bring down the valuable tenders to two or three for detailed consideration.

Reverting again for a moment to the definite, detailed specification—which is so valuable when we have an excellent article which suits our requirements and we wish to perpetuate its use—much work can be saved in this type of specification by using and incorporating existing and public standard specifications, such as those of the British

Engineering Standards Association (now the British Standards Institution). These standard specifications are usually the outcome of committee work by purchasing officers and manufacturers, and as much time letter, amendment to requisition, amendment to enquiry, order, acknowledgment of order, chasing form, advice note, advice for test, advice of completion, as well as in the invoice.



ENQUIRY.

Purchasing Department,
Marconi House, Strand,
London, W.C.2.

Purchasing Agents for

1. CABLES AND WIRELESS LTD., Electra House E.C.2.
2. Victoria Embankment Properties Ltd.
3. MARCONI'S WIRELESS TELEGRAPH CO. LTD. Strand, W.C.2.
4. Marconi's Wireless Telegraph Co. Ltd. Chelmsford, Essex.
5. Marconi International Marine Communication Co. Ltd. Strand, W.C.2.
6. Radio Communication Co. Ltd.
7. Chinese National Wireless Telegraph Company, Shanghai.
8. Peruvian Posts & Telegraphs, Lima, Peru.
9. IMPERIAL AND INTERNATIONAL COMMUNICATIONS LTD., Electra House E.C.2.

Dear Sirs,
Please quote us promptly your lowest prices on the quotation form attached showing discounts and terms of payment for supply of materials mentioned below

Yours faithfully,

For and on behalf of

Date of enquiry

Date of Quotation

Tenderer's Reference

Item No.	Quantity	MATERIAL	FOR ACCEPTANCE OUR OPTION			
			Price ex your works inspected	Charge for packing at cost	Price FOR suitably packed	Price D.D. paid to E. & O.E. or F.O.R. Seven Kings

Destination

IMPORTANT:—No quotation received after the date stated below will be considered.

Your quotation is required at MARCONI HOUSE by from which date please calculate calendar date for despatch allowing days for placing of order should your order be distributed.

Drawings and/or specifications are to be returned with quotation WITHOUT FAIL.

Z

QUOTATION.

Purchasing Department,
Marconi House, Strand,
London, W.C.2.

Dear Sirs,
We quote in reply to your enquiry of the as below in accordance with the conditions endorsed on the enquiry form.

Yours faithfully,

Date of Quotation

Tenderer's Reference

Tel. No.

Item No.	Quantity	MATERIAL	FOR ACCEPTANCE YOUR OPTION			
			Price ex our works inspected	Charge for packing at cost	Price FOR suitably packed	Price D.D. paid to E. & O.E. or F.O.R. Seven Kings

Destination

Awaiting you receive this quotation by and in the event of our being favoured with the order within days we can definitely promise despatch by

Drawings and/or specifications are returned herewith.

FIG. 2

Enquiry and Quotation Forms used by the London Office of the Marconi Companies

and research work has gone into their preparation it is obviously economical to use them, either in part or in total, where they apply rather than go over the ground again.

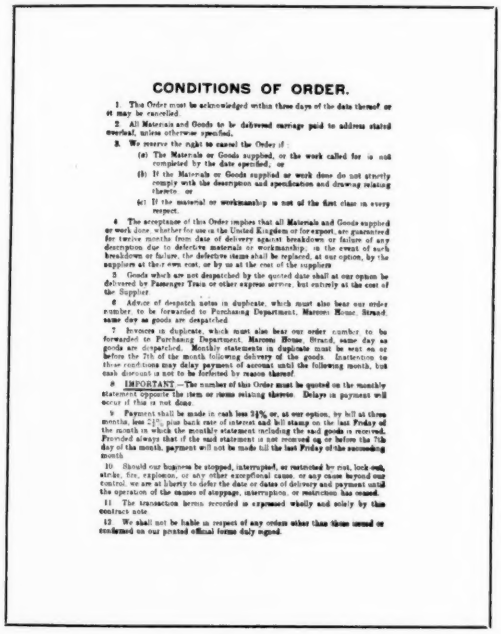
Considering the enquiry form in detail as now used by the London Central Office of our organization, you will notice on the left-hand side at the top the telephone extension is given, thus enabling the tenderer to get in direct touch with the buyer without the waste of time which so often occurs in large organizations where there are several people of the same name.

The buyer's reference at the top right-hand corner is the same reference as on the requisition but supplemented by the buyer's initials. The requisition number without the buyer's initials is retained throughout all transactions, as part of the full reference. It thus appears in the requisition, enquiry,

Further down on the form there follows a list of the companies for whom the particular office issuing the enquiry purchases, and just above the date of enquiry is a line to show on behalf of which companies the enquiry is issued. It might be for one company only, in which case the name of the company will be typed in, or the enquiry might be for a commodity used by several companies, in which case the names of the companies would be typed in. The "date of quotation" and "tenderer's reference" are left blank on the enquiry (Figure 2) but should be filled in by the tenderer on the quotation form which is sent out with the enquiry, and which in all essential points is a duplicate of the enquiry. The date of the enquiry is typed in and carbon copied on to the quotation form. Assume that the date is December 30. This appears in the quotation as "We quote in reply to your enquiry of

December 30, etc." I would next call your attention to the four columns provided for the quoted price. These are headed "Price ex your works, unpacked;" "Charge for packing, less allowance on return;" "Price F.O.R. suitably packed;" "Price delivered site or U.K./or (if for export) f.o.b. British port." These, taken in conjunction with "Destination" at the base of the form, enable us to decide whether to leave the delivery to the supplier or to use our own transport department to collect and deliver the goods. They also serve another useful purpose, for in many cases it is desirable to know the price of the goods, and not merely the price of the goods plus the transport of them, for next time goods are wanted they may be required for delivery to another destination, so that it is an advantage to have the price of the goods separate from the total price including delivery, even if you do not employ your own transport department.

The introduction of these four columns has had a material effect in reducing transport charges, and we do not find that manufacturers object to filling



CONDITIONS OF ORDER.

1. This Order must be acknowledged within three days of the date thereof or it may be cancelled.

2. All Materials and Goods to be delivered carriage paid to address stated overleaf, unless otherwise specified.

3. We reserve the right to cancel the Order if :

(a) The Materials or Goods supplied, or the work called for is not completed by the date specified; or

(b) If the Materials or Goods supplied or work done do not strictly comply with the description and specification and drawing relating thereto; or

(c) If the material or workmanship is not of the first class in every respect.

4. The acceptance of this Order implies that all Materials and Goods supplied or work done, whether for use in the United Kingdom or for export, are guaranteed for twelve months from date of delivery against breakdown or failure of any description due to defective materials or workmanship, in the event of such breakdown or failure, the defective items shall be replaced, at our option, by the suppliers at their own cost, or by us at the cost of the suppliers.

5. Goods which are not despatched by the quoted date shall at our option be delivered by Passenger Train or other express service, but entirely at the cost of the Supplier.

6. Advice of despatch notes in duplicate, which must also bear our order number, to be forwarded to Purchasing Department, Marconi House, Strand, same day as goods are despatched.

7. Invoices in duplicate, which must also bear our order number, to be forwarded to Purchasing Department, Marconi House, Strand, same day as goods are despatched. Monthly statements in duplicate must be sent on or before the 7th of the month following delivery of the goods. Inattention to these conditions may delay payment of account until the following month, but cash discount is not to be forfeited by reason thereof.

8. IMPORTANT.—The number of this Order must be quoted on the monthly statement opposite the item or items relating thereto. Delays in payment will occur if this is not done.

9. Payment shall be made in cash less 2½% or, at our option, by bill at three months, less 2½% plus bank rate of interest and bill stamp on the last Friday of the month in which the monthly statement including the said goods is received. Provided always that if the said statement is not received on or before the 7th day of the month, payment will not be made till the last Friday of the succeeding month.

10. Should our business be stopped, interrupted, or restricted by riot, lock-out, strike, fire, explosion, or any other exceptional cause, or any cause beyond our control, we are at liberty to defer the date or dates of delivery and payment until the operation of the causes of stoppage, interruption, or restriction has ceased.

11. The transaction herein recorded is expressed wholly and solely by this contract note.

12. We shall not be liable in respect of any orders other than those issued or confirmed on our printed official forms duly signed.

FIG. 3

Conditions of order printed on the back of the Enquiry and Quotation Forms

in the four prices, for they have themselves to get out the transport prices, in any case, before quoting for an article delivered to a stated destination.

Now, coming to the bottom of the form, the spaces and wording here and on the quotation must be taken in conjunction with one another. Consider that in the two spaces provided the following words have been inserted: "January 1st" in the first space; "3" in the second space. Now, as there is carbon paper between the enquiry and the quotation form, when the enquiry is typed these words appear on the quotation form, but the wording of the enquiry is, "Your quotation is required at Marconi House by January 1st, from which date please calculate calendar date for despatch allowing 3 days for placing of order, should your tender be successful," while the quotation reads, "Assuming you receive this quotation by January 1st and in the event of our being successful in obtaining the order within 3 days we can definitely promise despatch by, (say) January 15th, 1932."

On the back of the enquiry form and on the back of the quotation form are the conditions of order (Figure 3) and these are the conditions which are printed on all our official orders. This step ensures that a new supplier knows before he quotes with what conditions of order he will have to comply, and can put in a price to cover these conditions. Also, as the conditions appear on the quotation which he signs, he has to abide by them if his tender is accepted. It may be that this is, in part, the reason why in the nine years during which we have had centralized purchasing, and during which time we have placed a great many thousands of orders, that there has not been a single case in which a law suit has taken place in connection with any order placed by us and, in fact, there have been very few discussions, which, I think, shows that the use of this form removes the possibility of any ambiguity.

A.H.E.A. Seeks Certification of Standard Cleaning Fluid

The need for improved specifications for Stoddard solvent and for the certification and labeling of the product to safeguard the use of this cleaner in the home is the subject of the following letter dated May 20, 1933, which was addressed to the American Standards Association by Miss Frances Zuill, president of the American Home Economics Association:

For some time many of the members of the American Home Economics Association have been concerned with the serious hazard to life and property and the accidents caused by the use of dry-cleaning materials in the home. Gasoline is distinctly hazardous and other reagents often advertised as safe are too frequently marketed without explicit directions safeguarding their use. Education of the consumer

as to precautions which are essential when using the less dangerous chemicals for dry-cleaning seems to us to be the only reasonable procedure, but to do this effectively the solutions used should be identified as to quality and performance and accompanied by directions as to safety precautions which should be observed in the use of the specific solution.

Home economists faced with the necessity of helping homemakers with their cleaning problems are seriously handicapped because of their inability under present conditions to obtain essential information about the physical properties of available cleaning reagents. Stoddard solvent is considered to be far less hazardous than the more volatile hydro-carbons now extensively used in the home, but as this is often sold under some other trade name the user is unable to identify it and when using this solution does not know whether or not she is observing proper precautions. The American Home Economics Association has found, upon investigation, that revision of the present standard specification for Stoddard solvent (Bureau of Standards Commercial Standard C33-28) is under consideration by a committee sponsored by the Bureau of Standards and the American Society for Testing Materials. We understand that this committee is studying certain features of the solvent solution itself, particularly as affecting slowness and irregularity in the way the garments dry after being cleaned. It is hoped that this committee will shortly complete its deliberations and report a revised specification that will prove acceptable to all interests concerned and obtain approval as an American Standard.

If satisfactory national specifications for Stoddard solvent are prepared, the American Home Economics Association hopes that a cleaning solution complying with these specifications and marketed under the certification and labeling method may be made available to consumers. Our proposals are briefly as follows:

1. Containers should be labeled with a guarantee that the liquid complies with national specifications.
2. If brand names are used on the containers, the fact that the cleaning fluid is Stoddard solvent should be printed on the label in letters of a given size, the size of the letters to be determined with reference to the size of the label.
3. Full, explicit directions for safe use of the cleaning solution should also be given on the container.
4. Policing by a responsible agency would be necessary; this we believe should be performed by the American Petroleum Institute through analyses of samples of the cleaning solution purchased in the open market.

If these proposals are feasible and can be satisfactorily carried out, the Association will very gladly cooperate in spreading this information to its members and through them to other consumers.

Although the American Home Economics Association is not presenting this topic as a formal proposal for an ASA project at this time, we are seeking your cooperation in a study of the possibilities of such an undertaking. In addition to consumer groups, we believe several other organizations will be interested in this problem; therefore, copies of this letter are being sent to the following bodies: American Association of University Women; American Farm Bureau Federation; General Federation of Women's Clubs; National Association of Purchasing Agents; National Board of Fire Underwriters; National Bureau of Casualty & Surety Underwriters; National Congress of Parents and Teachers; National Fire Protection Association; National Grange of Patrons of Husbandry; National Retail Dry Goods Association; National Safety Council; Underwriters' Laboratories.

—

How Safety Codes Bring Savings

Questions have often been raised as to what savings can be made from the use of national safety codes. While there is no doubt that such inquiries can be answered with the statement that there are savings, it is not always easy to quote figures and facts. It is possible, however, to point to accidents which have occurred and to indicate how such accidents might have been prevented if the provisions of a safety code had been followed.

This is well illustrated in the article on "Dust Explosion Damage Preventable" which appears in the March, 1933, issue of the *Millers Review and Feed Forum*. The article lists five major dust explosions in grain elevators which resulted in six deaths and injuries to 22 persons. The property damage amounted to $1,185,000. This included the damage to the grain elevators and to the grain being stored. The article reports on the information given by Dr. David J. Price, Director of the Chemical Engineering Division of the Bureau of Chemistry and Soils, U. S. Department of Agriculture, and chairman of the sectional committee which has prepared a series of safety codes on the prevention of dust explosions, one of them covering terminal grain elevators.

In one of the most recent grain elevator explosions, he indicates that the use of proper venting, which is adequately covered by the Safety Code for Terminal Grain Elevators, would have averted this explosion. The Society of Grain Elevator Superintendents, which has had an active part in the preparation of this safety code, is doing much to advance its use among grain elevator operators through its educational campaigns.

Not all of the illustrations of savings made through following the provision of safety codes will be as dramatic as that discussed above. However, too great stress cannot be placed, particularly in depression times like the present, on the necessity for examining very closely the recommendations made in national safety codes as a means of bringing about savings which will tremendously reduce unnecessary losses and other costs of plant operation.

C. A.

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Safety Standards as a Factor in Accident Prevention[1]

by

W. R. Smith[2]

To an organization such as the American Standards Association, a "standard" is a thing very much alive, as alive, I should say, as a just completed railroad electrification project, with the first trains running on standard-size rails, made up of equipment and apparatus in accordance with the very latest standards, and operating on Standard Time. By this organization (at the request and with the cooperation of those identified with the industry that the standard will serve) such a document is produced and placed in the hands of all of those individuals and agencies that are concerned with its observance and conscious of the good that can come from its use in an intelligent and constructive way. Let us therefore characterize a standard thus:

> A standard is but the concise interpretation, for the benefit of all, of what may be regarded as the best practice out of our accumulated knowledge and experience.

It is not the desire of any of those who have been responsible for the production of standards or regulations to have them remain in the form and with the scope of their original drafting for even one day longer than they may be useful, and it must therefore always be borne in mind that there is nothing stagnant about a standard, provided of course it has been promulgated by the proper agency and is being used thoughtfully by all concerned. Perhaps experience with some aspects of a standard may show almost immediately that, as sometimes happens with tools of a somewhat complex nature, some parts may be too sharp and cut too deeply, while others may be too coarsely finished and fail to produce the results desired. In general, however, it can be readily demonstrated that in the completion of a new standard another forward step has been taken, that what has been produced approximates very closely the best for the purpose, and that in due time any slight imperfections will be corrected.

If, then, we accept it as fundamental that such documents can be employed effectively as tools in the production of a desired condition, what is our problem?

In exactly the same way that we would expect our engineering department to work with the established building departments, whether municipal or otherwise, and to see to it that regulations are observed and departures therefrom approved, we would desire our safety engineer to carry on his work. His tool box can not, therefore, fail to contain those standards that have been developed for the various phases of his plant's operation and which, if used intelligently, he will find have saved not only much of his own time, and directly and indirectly money for the plant, but have made it possible for him to devote the greater portion of his energies to studying those problems that are peculiarly his own. It is obvious that had such a man to do, himself, all the work of which the results are thus made available to him in standards, he would be no better off than a machinist who, called upon to do a piece of high precision work, had first to make all of his gauges and measuring instruments, and then determine and set down all of the tolerances to which he was going to work. Rather do all of us display wisdom by adopting a procedure that is today typical of the skilled mechanic who, using all of the standards and gauges and precision instruments made available to him by others, goes forward from the point where the others stopped and, not unwilling to utilize everything that has been done for him, concentrates on those details to which he himself must attend and for which, in fact, he may have ability that is little short of genius.

[1] An abstract of an address presented at the Greater New York Safety Conference held in New York City March 1 and 2, 1933.

[2] Assistant chief engineer, United Engineers and Constructors, Newark, N. J.; chairman of the Sectional Committee on American Standards for Safety in the Construction Industry (A10) under ASA procedure.

Perhaps never before in the history of our economic progress has there been a time when there was a greater opportunity for real benefits to be derived from our standardization movement than is now presented to our business leaders. These standards, these concise interpretations of the great wealth of accumulated experience, must inevitably be the tools that will make it possible for the skillful toolmaker to fashion dies from which may be cast proofs of a better and more intelligent management of business in all its phases.

You who occupy positions as safety engineers, safety directors, inspectors, are in reality sales engineers as well, and are called upon on occasion to make actual demonstrations of the usefulness and workability of your tools if you would extend their utilization. And you know that in every other like situation a satisfied customer is your greatest asset in seeking new ones. Results in such matters are cumulative, and, as the provisions of our standards are observed and supported by companies of influence and by men of recognized experience, by just so much is the prestige and influence of these standards increased.

Call such an individual document a code, and think of it as a volume containing rules and regulations which restrain or compel, and there is created in the mind an image that is entirely false in its characterization of the purpose behind it.

Again call it a code, but when you do, permit yourself to see before you those who have produced it, and those whose welfare its provisions are framed to promote, and then regard its statements and stipulations in the same manner that you would any other authoritative data which constitutes the best expression and record of the progress along a given line up to the present time. Once seen in the light of such an intelligent and sympathetic analysis and the true significance of what we mean when we speak of "American Standards for safety in industry" will be grasped.

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Simplified Practice Recommendation for Open Web Steel Joists

The Simplified Practice Recommendation covering open web steel joists has been reaffirmed, without change, by the standing committee of the industry, under the procedure of the Division of Simplified Practice of the National Bureau of Standards. The recommendation is concerned only with joists between 8 and 16 inches in depth and not longer than 24 times their depth, and specifies properties and allowable loads in pounds per linear foot.

Foreign Standards Available from ASA

New foreign standards available to Sustaining Members for loan or purchase through the ASA office are listed below. They are available in the language of the country under which they are listed. In requesting copies of the standards it is necessary to list only the ASA serial numbers preceding the titles. Send either a post-card or a note containing only the name of the person wishing to receive the standards, and the numbers of the standards desired. The card or envelope should be addressed to the American Standards Association, 29 West 39th Street, New York.

Serial Number

Great Britain

350. Pipe flanges (for land uses) (WSP above 900 lb and up to 1400 lb per sq in. and temperatures up to 800 F (427 C)

France

351. Autogenous welding, definitions
352. Autogenous welding, representation of welds on drawings

Austria

353. Cast iron
354. Malleable iron
355. Disc wheels for passenger automobiles
356. Flat glass
357. Gypsum
358. Identification colors for bare conductors in heavy-current switch installations
359. Painting
360. Roofing
361. Roofing felt in insulating felt
362. Rough bolts with hexagon heads, threaded full length
363. Rough bolts with square heads and square nuts
364. Rough hexagon nuts
365. Rough square nuts

Holland

366. Hospital furniture, beds and accessories, general information
367. Hospital furniture, beds for adults
368. Hospital furniture, beds for children
369. Hospital furniture, wheeled stretchers
370. Petroleum products for painting purposes.

ASA PROJECTS

The Ladder Safety Code[1]

by

H. D. Bender,[2] *Chairman*

Sectional Committee on Ladders[3]

The general use of ladders in industry, and in the household as well, makes the hazards incident to their use a matter of common knowledge. The report reproduced here will be of particular interest to every purchaser whose selection of a suitable ladder may mark the difference between long and satisfactory service, and possible injury and expense.

Mr. Bender is connected with the American Telephone and Telegraph Company, one of the largest users of ladders, and is chairman of the Sectional Committee on Safety Code for the Construction, Care, and Use of Ladders (A14) under ASA procedure.

Announcement of the completion of the revised code will be published in *Industrial Standardization* upon its approval by the American Standards Association.

The national program for the elimination of ladder accidents was initiated when the American Society of Safety Engineers accepted sponsorship for the ladder code in 1920 and organized a sectional committee to draft it. To insure that all interests in the project should be fully represented, the personnel of the committee included representatives of the ladder manufacturers, the lumber industry, employers and employees as ladder users, state regulatory bodies, the insurance interests, engineering and safety societies, and the Federal Government—in all, some 25 members.

The code was drafted in sectional form and represents a set of specifications which outline the standards of performance that are generally acceptable from a safety standpoint in the construction and installation of all types of ladders. It also includes recommendations and safe practices as regards the general use of ladders. The code was approved as a Tentative American Standard and issued during the latter part of 1923 as Bulletin 351 of the United States Bureau of Labor Statistics.

While the main object of the code is to promote safety, its acceptance by all interests offers a number of commercial and economic advantages as by-products. The most important of these are:

1. It serves as a background of common understanding between the users, ladder manufacturers, and other interests.
2. It standardizes and simplifies the problems of the lumber industry and broadens the field for their product.
3. In the ladder industry it brings standardization and simplification with mass production at lower costs.
4. It serves as a background for standardization to the big user and permits consolidated purchases for use throughout the country.
5. It makes available to the small user a satisfactory product at reasonable cost.
6. It serves as a basis for the establishment of uniform regulations by regulatory agencies.
7. It raises the quality level of the product.
8. Last, but not least, it serves as the foundation for further accident prevention work.

A question might well be raised whether these advantages are theoretical or whether they have actually been realized. This can best be answered, perhaps, by outlining the experience of the Bell Telephone System in their accident prevention work on ladders.

Ladders serve an important role in the construction, installation, and maintenance of the telephone plant. Practically every occupational employee has occasion to use one or more types and practically every automobile truck engaged in plant work is equipped for carrying one or more ladders. The types most commonly used are extension ladders, sectional ladders, step ladders, straight ladders, and rolling ladders.

When the national code was issued the only types covered by Bell System standards were the

[1] Reprinted from the *National Safety News*, April, 1933.
[2] American Telephone and Telegraph Company, New York, N. Y.
[3] (A14), under the sponsorship of the American Society of Safety Engineers—Engineering Section of the National Safety Council.

rolling ladders employed in the maintenance of central offices and a straight ladder for manhole use. The remaining types, which are largely employed by the outside construction and installation forces, were furnished under local arrangements established individually by each operating unit company.

With the issuance of the code, in 1923, steps were immediately taken to prepare detailed purchase specifications for the types not previously standardized. While these specifications were based upon the code requirements, they were drafted to cover a definite design, and the construction and material features were outlined more fully in order to eliminate all variables and permit the establishment of a thorough inspection routine. All ladders are purchased under our specifications and inspected by an experienced inspector to insure that all materials and workmanship are equal to or better than the specified limits or requirements.

In addition to the consolidation of purchases which insures competent inspection under standard specifications, many other activities contribute directly to accident prevention in the Bell System. Important ones that relate directly to the safe use of ladders include:

1. The standardization of plant design.
2. The preparation of standard practices for the construction and maintenance of each type of telephone plant.
3. Safety organizations which investigate, study, and recommend conditions or methods to effect improvements in safety.
4. The publication of posters to illustrate safe practices.
5. An educational program for training occupational employees in the most efficient and safest methods of performing their duties.
6. Preparation of safety codes for each class of work.
7. Study of accident data as a guide for future developments.
8. The development of improvement methods of transporting ladders on trucks.
9. A development program for investigating and trying out new products, designs, or processes in advance of their adoption.
10. The preparation of tool instructions to cover the use, care, and field maintenance of equipment.

The safety results of this program may be summarized as follows:

For convenience, let us assume that 100 represents the frequency index of lost-time accidents for ladders per 1,000 male plant employees for the year 1923. For 1924, when standards were in effect for extension ladders, this index dropped to 70, a reduction in frequency of ladder accidents of 30 per cent. In 1927, after all types were standard, the index was 61, or a reduction of 39 per cent. In 1929, the peak of plant activity, the index was reduced to 40, or a reduction in accident frequency of 60 per cent. Estimates for 1932, based upon the accident records for the first seven months, indicate an index of 26, or a reduction in the frequency rate of ladder accidents for the ten-year period of 74 per cent.

We have followed the ladder situation closely since the code was issued and find that many improvements have taken place. The lumber interests have improved their product through standardization of grading, the ladder industry has effected improvements in production methods, and a better product is available generally. Furthermore, the users are paying more attention to their ladder problems, and the general trend, particularly in industry, is toward higher safety standards. While all these benefits cannot be credited to the safety code, it must be recognized that it has proved an important factor in stimulating the endeavors and actions to minimize accidents in which the handling or use of ladders is concerned.

Several years ago the code committee undertook the revision of the code with the thought of bringing it up to date and of having the rating changed from tentative standard to standard. A few of the topics that came up for discussion in connection with this revision may well be mentioned here.

One of the first differences of opinion had to do with the section which outlined a proof test as a means of checking quality of the rails of extension and straight ladders. While this method of inspection is commonly applied to many kinds of materials, it has never been widely used to determine the suitability of timber or similar materials which have such a wide variation in their mechanical properties. Experience indicates that proper grading of the ladder stock, followed by adequate visual inspection of the completed product, offers a more reliable and a safer basis of insuring quality control.

The section on material requirements was originally based on minimum dimensions of parts and limiting the timber defects for each part. Inasmuch as it is a commercial practice to build certain grades and types of ladders considerably heavier than safe practices require as a minimum, the establishment of such inflexible grading requirements was con-

sidered by many as too severe. It was claimed that it resulted in unnecessary waste of material and uneconomical production. The proposed draft includes a complete revision of this section, allowing more latitude in the timber grading without impairing the over-all safety standards.

Uniform spacing desirable

The original draft included a number of specific construction or design requirements which were of questionable value from a safety standpoint. For instance, it requires a uniform step spacing of 12 inches for all types of ladders. There appears to be no question that uniformity of spacing is desired at all times. In general, the 12-inch requirement is probably satisfactory. However, there are cases where this equipment is designed to reach definite heights where operations are performed and it is entirely possible that a 10-inch spacing in specific cases might prove more acceptable from an over-all safety standpoint. This condition was recognized and a more liberal rule drafted.

Another feature which has occasioned considerable discussion has to do with rung construction. There are opinions that rung joints should consist of a full mortise and tenon; in fact, this requirement is included in a state code on ladders. On the other hand, the socket type of rung construction, in which the rung tenon does not extend entirely through the side rail, has been used extensively with satisfactory results. In fact, for certain classes of use it appears to offer advantages over the other construction. The principal objection to its use as a standard practice has to do with the difficulty of inspecting the finished product to insure an adequate bearing for the rung. Since the original draft of the code did not cover specific requirements for this feature, the revision recognizes both constructions, and outlines requirements for both.

Another feature which causes differences of opinion whenever ladders are discussed is the matter of so-called safety feet to prevent slipping of a ladder on its footing. There are many types available and new ones are continually being developed. They are generally recognized as a safety feature; however, due to the limitations each type has in the different classes of use and with the many different kinds of footing, no specific recommendations appear appropriate for inclusion in the code. It seems better to leave the decision of selecting safety feet to the different classes of ladder users who are intimately familiar with the types of surfaces encountered for ladder footings in their work and the other special conditions of use.

In general, quite a large number of the proposed changes involve substituting suitable performance standards for requirements which specify methods. The revision involves an additional section on mine-shaft ladders proposed by the mining industry and so many minor changes that it was found necessary to rearrange the entire text. Aside from a few last-minute suggestions, the revision is complete.

It is felt that the acceptance of the revised draft as an American Standard Safety Code will bring the different interests into closer agreement and will intensify their combined efforts toward the elimination of ladder accidents.

The Use of A.G.A. Seal on Approved Appliances

The following abstract of an article which appeared in the May issue of the *American Gas Association Monthly* refers to the recently approved American Standard approval and installation requirements for gas-burning appliances, and to the procedure for testing such appliances at the American Gas Association Testing Laboratory under the provisions of the standards. These standards were described in an article by R. M. Conner, Director of the American Gas Association Testing Laboratory, in an article on page 49 of the March issue of INDUSTRIAL STANDARDIZATION. The American Gas Association is sponsor for the project (Z21).

"Many companies have expressed concern over the fact that the use of the A.G.A. Laboratory Seal of Approval on approved appliances is not made mandatory by the recently published American Standard American Gas Association approval requirements for several types of appliances. . . .

"References to the Laboratory Seal of Approval in the A.G.A. approval requirements were deleted at the suggestion of the American Standards Association, since the policies of that organization do not permit approving any code as American Standard which specifies the use of the insignia of any one particular body or institution.

"In 1930, the A.G.A. Approval Requirements Committee became a sectional committee of the American Standards Association and, as a result, was enlarged to include representatives from the United States Bureau of Home Economics, the American Home Economics Association, the American Institute of Architects, the National Safety Council, Underwriters' Laboratories, the National Board of Fire Underwriters, and the Factory Mutual

Fire Insurance Companies. Since that time, seven sets of A.G.A. requirements have been approved as American Standard, and one set as American Recommended Practice. It is hoped that eventually all A.G.A. requirements for the approval, listing, and installation of gas appliances and accessories will be accepted as American Standard.

"The Laboratory Approval Seal will continue to be required on all gas appliances approved by the American Gas Association Testing Laboratory notwithstanding the fact that no references to the seal will be made in the requirements for the various individual appliances. Manufacturers of gas appliances are required by the Laboratory to agree in writing to display the Seal of Approval on all approved gas appliances sold, displayed, and/or offered for sale. . . ."

Project for Reference Data for Periodicals Requested

The American Standards Association has been requested by H. M. Lydenberg, president of the American Library Association, to arrange a conference to consider the possibility of establishing greater uniformity in the publication in periodicals of reference data concerning the periodicals; such as, information about frequency of issue, the names of those responsible for editorial and publishing policies, the place of publication, and the time of appearance of title pages and indexes. Librarians as well as readers of periodicals, especially research workers, have appeared to consider such uniformity to be highly desirable for clear order records, systematic indexing, cataloging, referencing, and binding.

To comply with this request the American Standards Association called a preliminary meeting on May 19, 1933, at the New York Public Library, which was attended by representatives of the following organizations: American Library Association, Special Libraries Association, American Council of Learned Societies, Associated Business Papers, Inc., Engineering Index Service, Engineering Societies Library, Publishers' Weekly, and McGraw-Hill Publishing Company.

The American Standards Association is now planning to appoint a committee representative of the groups most directly interested which would draft a proposal for submittal to all groups concerned for their consideration and acceptance as an American Recommended Practice.

The following tentative scope for the proposed project has been suggested:

> Rules specifying the kind of data required for clear order records, systematic indexing, cataloging and binding of periodicals, and the manner in which these data should be arranged as part of the make-up of the periodical.

Standard for Hosiery Lengths Submitted for ASA Approval

The National Bureau of Standards has submitted to the American Standards Association the Commercial Standard for Hosiery Lengths (CS46-33) for approval as American Standard. This commercial standard has been developed in cooperation with the National Association of Hosiery and Underwear Manufacturers through committees and conferences in which representatives of manufacturers, distributors, and consumers participated. On April 18, 1933, acceptances had been received from six associations, six departments of the federal government, and 289 companies engaged in manufacturing and distributing hosiery.

The standard provides methods of measurement and also specifies the lengths of hosiery, together with tolerances, for the guidance of producers, distributors, and consumers. The various types of hosiery covered include ladies' full-fashioned, seamless and ribbed cotton hose, men's, boys', children's, and infants' hosiery of various types.

A.S.T.M. Submits Gypsum Standards to ASA

The American Society for Testing Materials has submitted the following five specifications for gypsum and gypsum plasters for approval as American Standards under the proprietary sponsorship method: Gypsum (A.S.T.M. C22-25); Calcined Gypsum (A.S.T.M. C23-30); Gypsum Plasters (A.S.T.M. C28-30); Gypsum Molding Plaster (A.S.T.M. C59-30); Gypsum Pottery Plaster (A.S.T.M. C60-30).

These specifications were developed by A.S.T.M. Committee C-11 on Gypsum during the period of active study extending over several years prior to 1930. An examination of standards in the field of gypsum and gypsum plasters indicates that these particular specifications are either the only standards for these commodities or, in those cases where other standards have been found, it has been noted that technical requirements are practically identical

with those given in the A.S.T.M. specifications. All of these standards are in current use in industry.

The specifications covering gypsum are used in the manufacture of Portland cement, plate glass, wall plasters, structural products, and pottery. They are also applicable when gypsum is to be used as fertilizer. The specification for gypsum plasters has an extensive use in building construction, and this specification, as well as the specifications for gypsum and calcined gypsum, is referred to in building codes and ordinances on plastering. The specifications for gypsum molding plaster cover its use in ornamental work such as interior embellishments and cornices on walls and ceilings; also for staff work, plaster casts, etc. Gypsum pottery plaster is primarily used in the manufacture of molds of intricate design and outline such as used in the shaping of clay, terra cotta, and ceramic forms.

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Editorial Cites Need for Safety Glass Project

Glass is used, in these modern times, in very many ways in which it becomes a new source of peril as well as a great convenience. This has led the National Bureau of Casualty and Surety Underwriters to appeal to the American Standards Association for the preparation of an adequate code of safety standards for glass used where breaking is likely to result in injuries for which compensation must be made.

The Association has undertaken the task, and the actual preparation of the code of specifications and the methods of tests will be assigned to a committee of technicians representing the industries using or manufacturing safety glass, insurance companies, safety organizations, and public regulatory bodies.

One state at least, Massachusetts, has already adopted specifications to which all laminated glass installed in motor vehicles registered in that state must conform. With the states beginning to act in that direction, one can readily see the great inconvenience and confusion which will result unless a uniform standard is applied in virtually all of them.

That standard should, of course, be high, and it can be prepared under no better auspices than those of the American Standards Association, in which some 40 prominent organizations are members, such as manufacturing companies, public utilities, scientific societies, and departments of the federal government.—*Reprinted from the Columbus, Ohio, "Dispatch", April 11, 1933.*

Subcommittee to Correlate Scientific and Use Classifications of Coal

A new subcommittee on the Application of Scientific Classification of Coal has been appointed by W. H. Fulweiler, chairman of the Technical Committee on Use Classification, a subdivision of the Sectional Committee on Classification of Coals (M20). The new subcommittee will act as a correlating committee to harmonize the scientific classification of coal as prepared by the Technical Committee on Scientific Classification with the practical use classification of coal as worked out by the Technical Committee on Use Classification.

The membership of the new subcommittee is as follows: T. W. Harris, Jr., division purchasing agent, E. I. duPont de Nemours and Company, Wilmington, Delaware, *chairman;* Gilbert Francklyn, fuel agent, Consolidated Gas Company of New York, New York, *secretary;* S. B. Flagg, fuel engineer, Phoenix Engineering Corporation, New York; J. B. Morrow, preparation manager, Pittsburgh Coal Company, Pittsburgh; Malcolm MacFarlane, Bird Coal Company, New York; R. E. Gilmore, superintendent, Fuel Research Laboratories, Department of Mines, Ottawa, Ontario.

The American Society for Testing Materials is sponsor for the project on Classification of Coals (M20).

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ASA Withdraws Standard Specifications for Putty

The Standards Council of the American Standards Association has voted to withdraw its approval of the American Tentative Standard Specifications for Putty (A43-1930). It has also decided to invite the American Society for Testing Materials to assume sponsorship for this project (A43) in place of the Federal Specifications Board.

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City Adopts Standards for Electric Devices

Glendale, California, has adopted an ordinance forbidding the sale within the city limits of electric devices or appliances which fail to meet the standards of safety of the National Board of Fire Underwriters or the American Standards Association. According to the San Diego, California, *Transcript,* it is expected that within the next few months such ordinances will be in effect throughout Southern California.

WHERE INDUSTRY UNITES

An editorial in the New York Sun of May 29, 1933

American industry should have no doubt about its ability to cooperate. Business men may wonder if industry is willing to make intelligent use of the power of trade associations; they may feel apprehensive over the idea of a government dictator who will have power to compel the unwilling members of any trade to accept wage agreements and production schemes. Such anxiety is to be expected in a period which has seen many ambitious plans fail of achieving their ends. But there is no question that industries and their trade associations can work well together toward some common end. They have demonstrated that by the way they have worked many years for standardization.

That effort is a precedent to be followed in spirit by those business interests now aligning themselves in support of the recovery program. Self-rule is a bigger task than ordinary cooperative work; it demands prompt, united action by organized trades that understand what business can do to control its own operations. . . .

Mass production could not have been developed to its present efficiency without the continuous and harmonious efforts of business men and technical men to standardize their processes, machinery and styles. In its latest year book the American Standards Association points out that standardization is in reality a form of industrial self-regulation. "Standardization lies at the heart of mass production. With a standardized product, buyer and seller speak the same language; fairness in competition in both domestic and foreign trade is promoted."

Among new standards adopted last year, for example, is a series of methods for testing petroleum products, a set of abbreviations for scientific and engineering terms, a series of requirements for gas ranges and standards for radio broadcasting receivers. All of these were fixed after long periods of cooperative work by committees representing a number of industries, and in some cases a number of branches of Government.

A single proposal to standardize a certain kind of mechanical equipment has demanded that fifty representatives of industry and Government serve on some fourteen subcommittees. Members of a long list of technical societies and trade bodies, composing a cross section of such industries and trades as plumbing, refrigeration, electric lighting, naval architecture, rapid transit, water supply, heating engineering and fire protection, as well as three bureaus of the United States Navy and a section of the Department of Commerce, sent members to work on this one standards committee.

The standardization movement in industry is not isolated from other concerns of business. It has had an influence on costs of production, on prices and on consumer demand. It has had to consider markets, machinery, seasonal output and competition. It may be found that the cooperation of industry with Government under the new control plan will achieve results partly because of the experience industry has had in standardization.